

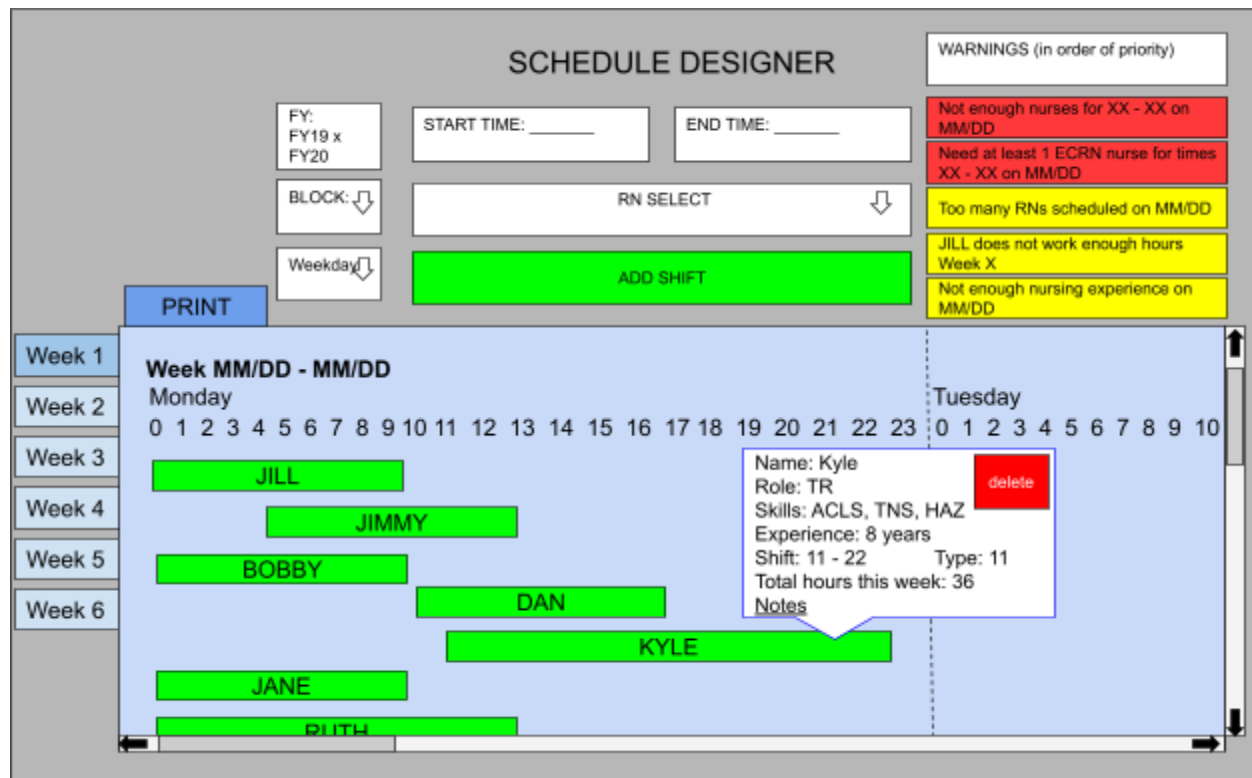
- User-Interface
 - Language: Angular10
 - Operating System: Linux/Windows
- API/Creation of a service layer
 - This layer will be responsible for abstracting out the API communication.
 - Language: Python (Flask, or any other service)
 - Operating System: Linux

Previous Work:

During the Summer of 2020, Medecipher worked with another group of CS@Mines students to create some potential designs for the user interface. The medecipher team provided feedback on the four designs you can use to get a better understanding of what we're looking for.

Design 1:

Adjusted GANTT Chart Schedule Planner



Description:

Schedule Module:

This model is built with a double scroll feature, to view a whole week at once (side-to-side) and to view all the nurses scheduled for a selected time, with each nurse having their own row.

Week Selector:

On the left hand side, there are 6 buttons that will bring the user to different weeks of the block. In reality, they would most likely be labeled with the actual week dates.

Print Button:

Brings the user to the print screen

Shift Creator:

Given a specific block, weekday, and time, a nurse will be given a shift and added to the schedule for those days

Warnings:

There is a list of warnings, listed by severity/priority, for the manager to view and deal with.

Notes:

This could be either a hyperlink to a pop up menu or could just extend the information box

Limitations:

- Would need a different screen to set limitations / filters for nurses individually
- There is A LOT going on on just one screen
- Double scroll might be annoying to user
- When a weekday is selected, does a nurse get a shift for all 6 weeks on that day, or just the one day?
- Should requirements be listed somewhere?

Possible Small Changes

- Instead of start and end time, there could be a drop down menu with the shift type with the times includes (D, D12, D9, 11, 3, E10, N12)
- Make weekday a series of buttons instead of drop down menus

Medecipher Team Feedback:

What aspects of this design should we keep, and why?

- Warnings are clear, prominent, and instructive
- most similar to current gantt chart view - intuitive display of final product/schedule
- Warnings and Info need to be kept as heads up info displays. I like the dotted line between days. The nurse info popup is full of great info.
- Warnings is good to keep since it warns the user what's the ongoing situation is. Weekly tabs on the right are nice since it keeps the schedules more organized.
- Tabbed view of weeks
- The layout is clean and efficient - The main view is well thought out.

What aspects of this design should we remove/change, and why?

- I would prefer the add functionality was more in the schedule, instead of above
- while the end result is nice, it seems like a lot of manual data entry. reference for warnings/errors are challenging. not clear how you it would populate
- Week tabs should be a calendar view, the delete button should probably say 'remove'
- Maybe there should be subtabs for each day of the week for each weekly tab.
- Warnings should be more compressed
- I think this design needs to have more area for the actual schedule view. Move the stuff above to the left and expand the schedule view.

Would you use this design to create a staff schedule?

- Yes - 3
- Maybe - 1
- No - 2

What is one thing that should be added to or removed from this design?

- This needs more information: staff target vs current level, total shift length;

- need some reference to warnings & tallies for counts of RNs. also this goes for all the days but schedule should be 7a - 7a the following day, vs. 0 - 23
- Color coding of staff if someone goes > 40h (or some set parameter)/ possibly bake some staffing warnings into the individual staff, possibly add grid lines option

What questions do you have about this design?

- Not certain the interactions are for the user -- what can be done here? Can user take action on the warnings? How?
- unclear what is pre-populated or user entered
- Which buttons open a modal dialog and what do those look like?

Design 2:

Spreadsheet Style Schedule Planner

SCHEDULE DESIGNER

FY:
FY19 x
FY20

BLOCK: ↓

Weekday ↓

SHIFT TYPE ↓

RN NOTES:
Experience, work filters, part time/full time, etc.

RN SELECT ↓

ADD SHIFT

PRINT

SORT BY ↓

WARNINGS (in order of priority)

Not enough nurses for XX - XX on MM/DD

Need at least 1 ECRN nurse for times XX - XX on MM/DD

Too many RNs scheduled on MM/DD

TIFFANY does not work enough hours Week X

Not enough nursing experience on MM/DD

Week 1	Nurse	Qualifications	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Week 2	JAMES	ACLS, ECRN	D12	D12		D12			
Week 3	TIFFANY	TNS				D9	D12		D9
Week 4	LAURAL	TNS			N12		N12		
Week 5	JOSH	PALS	E10			E10	N12	3	
Week 6	RICKY	HAZ		D9		D9		D9	D9
	BOBBY	TNCC, HAZ	D9		D9		D9		
	GARBANZO	ACLS, ECRN, TNCC	D12		D12		D12		
	FETTUCCINI	ACLS	D12	D12				D12	
Week of MM/DD	MORT	ACLS, TNCC				N12		N12	N12
	REMI	TNS		E10	3	E10			E10

Description:

Schedule Module:

This model is built with only one single scroll feature, to view all the nurses and their shift types.

Week Selector:

On the left hand side, there are 6 buttons that will bring the user to different weeks of the block. In reality, they would most likely be labeled with the actual week dates.

Print Button:

Brings the user to the print screen

Shift Creator:

Given a specific block, weekday, and time, a nurse will be given a shift and added to the schedule for those days

Notes:

The notes will update when the nurse is selected, to show the user the RN preferences and info

Warnings:

There is a list of warnings, listed by severity/priority, for the manager to view and deal with.

Sort By:

This can help the user, in viewing the nurses by shift type, first day working, experience, etc.

Limitations:

- Week # may be better as a drop down menu instead of buttons
- Manager would need to know shift types
- When a weekday is selected, does a nurse get a shift for all 6 weeks on that day, or just the one day?
- Should requirements be listed somewhere?

Possible Small Changes

- Make weekday a series of buttons instead of drop down menus
- Make week button a drop down menu instead of buttons
- Move around print / sort buttons
- Have warnings highlight the nurse / day that are causing an error

Medecipher Team Feedback:

What aspects of this design should we keep, and why?

- I really like this as a way to preload the schedule based on nurse prefs/desired shift types. think this format in conjunction with a gantt-style view is most effective for data entry & display. I like the "sort by" feature
- Easy to read qualifications, but I kind of liked them in the think bubble/hover over from the last schedule mockup. Perhaps combine and have both features? I like the week of MM/DD tab, that's nice.
- Qualifications column is good to have along with the detailed shift type for each day of the week.
- I like the excel styled visual
- I not a fan of this view

What aspects of this design should we remove/change, and why?

- I don't think you can effectively assess errors/warnings in this view.
- Sort should be on the schedule headers. "There's nothing like another modal dialog to brighten your day." Bake some of the warnings into the staff display? Also I think that maybe we can have a list of RNs available to add/remove? I think this would avoid another dialogue that you need to open to do something. Fewer clicks mean faster scheduling.
- None
- Buttons up top are a bit cluttered/ not attractive
- This may be useful to individuals who want to see their specific schedule

Would you use this design to create a staff schedule?

- Yes - 3

- Maybe - 1
- No - 1

What is this design lacking, and why?

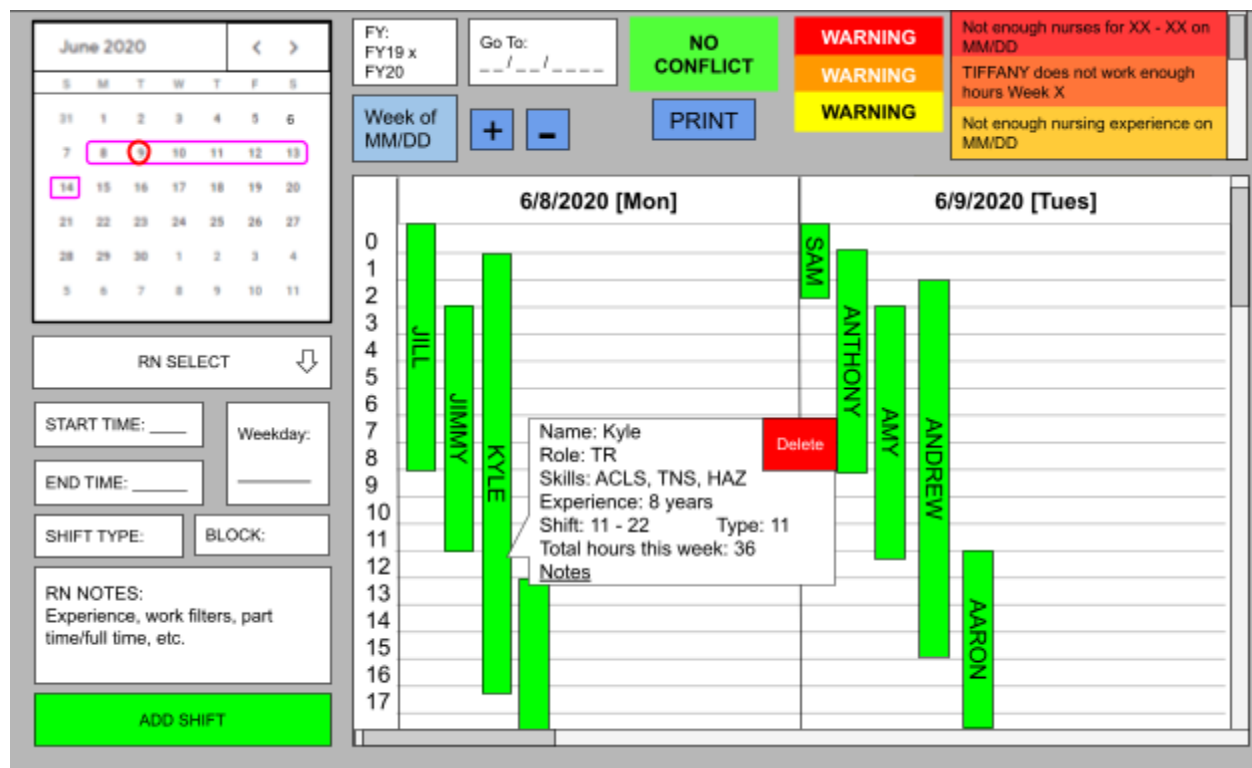
- also needs a gantt chart view where hourly supply/demand matching is visible. would be good to have a "shift preference" option matching each RN with each shift type. Also seems maybe unnecessary to split by weeks here since it creates more clicking with not clear value? Trying to get 2 weeks' worth of data in the view at least would be ideal. In Excel can horizontally scroll to see all 6 weeks in a single view.
- A calendar. Having the tabs is ok, but I think having the bird's eye of the calendar view would help me keep things straight. The tabs remind me of excel.
- Visual representation of the actual time scheduled

What questions do you have about this design?

- General comment: I'm happy that Nurse Fettuccini has ACLS. Real question: Are the certifications modifiable easily? Perhaps with the correct user, I could edit them directly in the form?

Design 3:

Vertical Schedule Planner



Description:

Schedule Module:

This model is similar to the GANTT chart style, but is done vertically in order to better count the amount of nurses at a given time. This also allows for nurses to be placed in the same columns ,

therefore making a smaller total image (however this is optional as there is separate benefit to giving each nurse their own column).

Calendar:

The calendar displays the current days selected. It also displays days that currently have a conflict with a circle around the day in the color of the severity of the conflict.

Add Shift:

The shift creator has been isolated to its own block in the lower left corner, containing the same aspects of the shift creator as the previous models.

Go To:

Goes to the specified day. Also sets the week to the week that the day is part off.

+/-:

Zooms in or out of the schedule display.

Print button:

Brings the user to the print screen.

Notes:

The notes will update when the nurse is selected, to show the user the RN preferences and info

Warnings:

There is a list of warnings, listed by severity/priority, for the manager to view and deal with. The color of the "WARNING" box changes based on the most severe warning. If there are no warnings then "NO CONFLICT" will appear, assuring that everything is alright. The warnings themselves are in a scrollable box.

Limitations:

- Potential display issue from the end of a week to the beginning of the next.
- Manager would need to know shift types
- Schedules based on day of month, meaning schedule does not repeat weekly. This could be fixed with a "Copy Week" feature.
- A couple features here are redundant ("Go To and Clicking on the "Calendar", "Warning" displays in several locations)

Possible Small Changes

- "Go To" could be removed if the day could be selected via the calendar.
- "+/-" should probably be implemented into a scrolling feature rather than buttons.
- Some aspects of this are redundant, such as multiple locations of warnings. Some could be omitted.
- Have warnings highlight the nurse / day/ time that are causing an error

Medecipher Team Feedback:

What aspects of this design should we keep, and why?

- I really liked this take on the view! Liked the calendar view option as well
- Conflict checking is a great idea. Love that. Love the birds eye view of the calendar. Flipping the schedule view is cool and useful. Week of MM/DD display is helpful if you

are scheduling on a Wednesday and need to quickly know which week you are on. I like this layout a lot. Keep the layout, it's intuitive to how you would go about scheduling. The hover over box is back too. That's great.

- The calendar is nice to have. Perhaps it should be integrated in the other designs.
- Varied views, calendar widget is very cool
- The condensed controls above the main view

What aspects of this design should we remove/change, and why?

- need a dedicated spot to display error/warnings. Is a great display view, but seems like it might be challenging to interact with and enter in info yourself.
- Perhaps add week number to the week of MM/DD? Additionally, a toggle to flip the schedule around the y axis, this seems like the best design yet. I would like to see this design explore Scaling vs scrolling
- Hours on the left should be reformatted as 0:00, 1:00, etc. Not really a fan of the vertical columns.
- Vertical Gantt is kind of confusing to look at
- The calendar is nice, but occupies a lot of space

Would you use this design to create a staff schedule?

- Yes - 4
- Maybe - 0
- No - 1

What is this design lacking, and why?

- think it needs an input form to pre-load the content
- "Rn Select could auto search names. Avoiding pop ups and data entry dialogs should be considered. I should be able to start typing a name and have it magically pop up with options for my nurse unit. Also a feature to copy a weekly schedule. When you hit ""new schedule"" it could ask you if you want to copy / transfer the schedule from last week and how far forward you wish to propagate the schedule.
- ""I want this week to repeat for the next 6 weeks, then I can go in and change it up here and there"" "

What questions do you have about this design?

- might need a shift identifier (e.g. D9, D12) in addition to the RN name since it's a bit of a deviation from a normal view with the vertical vs. horizontal text. Also would want to look into stacking shifts to minimize horizontal scrolling across days.
- Would this feed into a bigger scheduling dashboard?

Design 4:

Spreadsheet Style Alternate Schedule Planner

RN

TR

WR

CH

FY: FY19 x FY20

Week of MM/DD

WARNING
 UNDERSTAFFED
 OVERSTAFFED
 LACK OF EXPERIENCE
 MISSING SKILL XYZ
 NOT ENOUGH HOURS

PRINT

		Monday																									
Week 1	REC COUNT	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	COUNT	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Week 2																											
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0	1
Week 3	Jimmy	↓																									
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Week 4	Jimmy	↓																									
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Week 5	Jimmy	↓																									
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Schedule module:

This model is based on a more interactive spreadsheet style planner. It also is based on the scheduling software used at golf courses.

Nurses Column:

Each nurse has their own row. Clicking on the [↓] in the nurse row provides information on the selected nurse. To register a nurse for a specific time, the user needs to just click on a box in the grid, and the nurse will be scheduled for that time. Clicking on a box with a shift already scheduled removes the shift for that hour.

Warning Row:

The colored row above the time is the warning indicator row. If there is no warning, it will simply light up as a green box. If there is a warning, the respective column for the hour will change color to the most severe warning and create a pulldown menu ([↓]) containing a description of all the warnings for a given hour.

Count and Rec Count Rows:

The "COUNT" row displays the current count of nurses scheduled for a given time. The "REC COUNT" row displays the number of nurses recommended by the model for a given hour.

Role Selector:

This selects which role to display the schedule for.

Week Selector:

This selects which week to display the schedule for.

Print Button:

Brings the user to the print screen.

Add Nurse Button:

The "Add Nurse" button creates a popup that will ask for information on the nurse being added. After being added, a nurse will appear in a new role for the role(s) they were selected for. The other information can be accessed from the [↓] in the respective nurse's row.

Limitations:

- Shift must be punched in hour by hour.
- Potential display issue from the end of a week to the beginning of the next.
- Removing a nurse from one role could end up removing them from all roles. If not, reregistering that nurse could create a duplicate.
- Roles are in separate views and may be difficult to compare with each other.

Possible Small Changes

- Add a way to schedule a shift from a Start to Finish.
- Connecting to a database that contains "Nurse" objects would make "ADD NURSE" much easier.
- Make it obvious how many nurses are needed at any given hour so the manager doesn't have to guess and get a warning first.

Medecipher Team Feedback:

What aspects of this design should we keep, and why?

- seems really intuitive to be able to edit shifts and extend hours. also the grid lines while clunky/old school aesthetic make it very easy to ID when shifts are starting/stopping - no need for extra shift type identifiers.
- Add Nurse pop up is nice. Keep everything except for notes
- Warning indicator for each hour is nice. Shift tab is cool, too. The Nurse pop-up message is a nice addition to have.
- Info bubble is really helpful
- Excellent space management, big view of the time scheduled.

What aspects of this design should we remove/change, and why?

- like the idea of grouping types of RNs, but may be simpler to group "direct" and "indirect" to minimize clicking. also would prefer seeing this as a filter button vs. a tab, as you likely want to be able to print or view the day with all RNs assigned
- Notes needs to be discrete fields. You can do nothing with a blob of text.
- Weekday subtab to avoid the horizontal scrolling.
- Drop down arrows make the view too active and confusing
- Perhaps adding a small calendar view to the top left would make it clearer what week you were working in

Would you use this design to create a staff schedule?

- Yes - 3
- Maybe - 1
- No - 1

What is this design lacking, and why?

- like the calendar view vs. weeks for tabs
- Digits. Need some contact info. If I'm scheduling then I need to know if Sally can work on Tuesday. Having this info heads up might be helpful.
- Guidance on what the arrows are for

What information should be included on the "Add/Import Nurse" pop-up?

- shift preferences/PTO requests, hours worked
- Phone, email. Import/EDI yes please.

What questions do you have about this design?

- while I like the colors for the warnings, if there are multiple warnings per cell, would be hard to display. would prefer using symbols or letters to describe warnings w/legend
- where's the remove nurse? Tim got a job over at county and he doesn't work here no more.
- Why is there multiple Jimmy?

Conclusion:

Medecipher Team Feedback:

Which design did you like the most?

Design 1 - 0

Design 2 - 2

Design 3 - 1

Design 4 - 2

Which design did you like the least?

Design 1 - 1

Design 2 - 2

Design 3 - 0

Design 4 - 2

Given the designs shown the Mines team would recommend that Medecipher use Design 4 (or something similar to it)*. Design 4 seems to best implement the requirements Medecipher is looking for and should be the best to use from a user perspective. It is interactive, fairly self-explanatory in it's design, and is derived from a combination of Medecipher's current spreadsheet design and on-market scheduling software, making it a logical next step in the design of Medecipher's product.